NOTES ON MALVACEAE. VIII. EREMALCHE

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The genus *Eremalche* was published by Greene (1906, p. 208) with a few words of description and citation of three species previously referred to *Malvastrum* — *M. rotundifolium* A. Gray, *M. exile* A. Gray, and *M. Parryi* Greene. A fourth species, *Eremalche kernensis* C. B. Wolf (1938, pp. 66, 67), was published subsequently. Jepson (1925, p. 633 and 1936, pp. 496, 497) referred the three species cited by Greene to *Sphaeralcea*, but they have been retained in *Malvastrum* in other recent floras (Munz, 1935, p. 308; Kearney et al., 1951, p. 548). It remained for Wiggins (1951, pp. 96, 97) to recognize *Eremalche* as a valid genus and to describe it formally, with a key to and descriptions of the four species.

In my synopsis of the American genera of Malvaceae (Kearney, 1951, pp. 119, 120), *Eremalche* was treated as a section of *Malvastrum*. Now, however, I find myself in agreement with Wiggins as to its validity as a genus. Krapovickas (1954, pp. 609, 610) had arrived at the same conclusion, pointing out that in *Eremalche exilis* the diploid number of chromosomes is 20, hence a multiple of 5, as was found to be the case in *Sphaeralcea* (*Eusphaeralcea*) by Webber (1936, pp. 314, 315) in fifteen North American species and by Krapovickas (1949, p. 185) in thirteen South American species. On the other hand, in *Malvastrum,* as I have sought to re-define the genus (Kearney, 1955), Krapovickas (1954, p. 610) found the basic chromosome number to be 6 ($2n = 12, 24, 36$). He considered *Eremalche* to be nearer *Sphaeralcea* than *Malvastrum,* but mentioned a character stated to be unique in Tribe *Malveae* — adherence of the carpel-wall to the seed.

As treated herein, *Sphaeralcea* is the *"Eusphaeralcea"* of an earlier publication (Kearney, 1935), *Malvastrum* the genus as restricted in a recent paper (Kearney, 1955), and *Eremalche* as defined by Wiggins (1951). The more important distinguishing characters of these three genera may be stated as follows:

Sphaeralcea. Carpels (Kearney, 1935, pls. 9–12) 1 to 3-ovulate, apical section smooth, dehiscent, with ventral notch at base, the basal section indehiscent, reticulate. Annual or perennial herbs, the flowers commonly thyrsoid-paniculate, the corolla grenadine-red, varying to mauve-pink (drying violet) or nearly white, also yellow or orange in a few species. Basic chromosone number 5.

Malvastrum. Carpels (Kearney, 1935, pl. 2, figs. E, F, H) 1-ovulate, little differentiated apically and basally but with an (often deep) ventral notch, reniform-suborbicular to almost triangular in outline, incurved-

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rostrate, radially rugose to nearly smooth on the sides, usually pubescent above, with or without dorsal and subapical cusps or tubercles, slightly and tardily dehiscent apically. Perennial (sometimes annual?) herbs or undershrubs, the inflorescences various, the corolla yellow or orange. Basic chromosome number 6.

Eremalche. Carpels (Kearney, 1935, pl. 2, fig. G) 1-ovulate, undifferentiated apically and basally, obscurely or shallowly notched ventrally, orbicular or nearly so, muticous, bordered by a radially rugose or reticulate-rugose cushion-like thickening, with smooth or faintly reticulate lateral walls, the carpels indehiscent or tardily and irregularly dehiscent by rupture of the thin lateral walls. Small annual herbs, the flowers solitary in the axils, often long-pedunculate, the corolla whitish to mauve-pink (drying violet). Basic chromosome number 5, at least in *E. exilis*.

Sphaeralcea is widely distributed in western North America, from southern Canada to Mexico, and is also well represented in southern South America. *Malvastrum* ranges from southern Arizona to Florida and the West Indies, south to Bolivia and Argentina. *Eremalche* is confined to the southwestern United States and northern Baja California, perhaps also northern Sonora.

On the basis of my observations on herbarium specimens, a key to the four taxa in *Eremalche* recognized by Wiggins is presented here. The term "taxa" is used because I am uncertain that *E. kernensis* can be maintained as specifically distinct from *E. Parryi,* but in the present state of knowledge I am not prepared to reduce it to subspecific status.

Key to the Taxa

1. Leaves merely coarsely crenate, reniform-orbicular; herbage, involucel, and calyx hispid with long, simple or 2–3 furcate hairs; petals with conspicuous basal spots; carpels 3–3.5 mm. in greatest diameter, thin, flat, rugose-reticulate dorsally and subdorsally and often more finely so laterally, black at maturity. Petals (15?) 20–25 mm. long, lilac or mauve-pink, drying violet. Southern California and Nevada, western Arizona.....*E. rotundifolia* (A. Gray) Greene

1. Leaves palmately 3–5-lobed or -parted; herbage, etc., shortly stellate-pubescent and often with longer simple or sub-simple hairs but all of the pubescence relatively soft and fine; petals without basal spots; carpels not more than 2 mm. in greatest diameter, somewhat turgid, radially rugose dorsally and subdorsally, smooth laterally, pale- to dark-brown at maturity.....(2)

2. Petals not more than 6 mm. long, little surpassing the calyx; peduncles in fruit up to 4 cm. long but usually much shorter; leaves mostly cleft to about the middle, the lobes shallowly few-toothed or nearly entire. Herbage, etc., shortly stellate-pubescent but occasionally with a few longer, simple or subsimple hairs; calyx-lobes lanceolate or ovate-lanceolate, attenuate-acuminate; corolla whitish or pale lavender. Southern California to southwestern Utah, Arizona, and northern Baja California .....*E. exilis* (A. Gray) Greene

2. Petals 8 mm. or longer, much surpassing the calyx; peduncles in fruit often much more than 4 cm. long; leaves usually more deeply dissected and the lobes with more numerous and longer teeth or lobules.....(3)

3. Herbage normally with few or many, relatively long, simple or 2–3-furcate hairs in addition to the short stellate pubescence; calyx-lobes normally ovate and abruptly long-acuminate, but exceptionally lanceolate and attenuate-acuminate; petals mauve-pink, drying violet, 13–26 mm. long. Inner Coast Ranges of southern California, principally in western Kern County....*E. Parryi* (Greene) Greene

3. Herbage shortly stellate-pubescent, occasionally with a few longer hairs; calyx-lobes lanceolate or ovate-lanceolate, attenuate-amuminate; petals whitish or pale lavender, 8–13 mm. long. Apparently restricted to western Kern and San Luis Obispo counties, California .....*E. kernensis* C. B. Wolf

Eremalche rotundifolia is a remarkably uniform species and no intergradation with the other three taxa has been observed. The latter, however, as indicated in the key, seem to intergrade. The possibility that *E. kernensis* originated as a hybrid between *E. Parryi* and *E. exilis* is suggested. It approaches *E. exilis* in character of the pubescence, shape of the calyx-lobes, and corolla-color, but is nearer *E. Parryi* in leaf-shape and size of the corolla. Specimens collected recently by Ernest C. Twisselmann in the Temblor Valley region, western Kern County, California, where the type of *E. kernensis* was found, show various combinations of the characters of *E. Parryi, E. exilis,* and *E. kernensis*. Some of these are probably edaphic variants, as the habitat varied from dry sandy situations to clay-loam and more or less saline flats.

It is probable that biosystematic investigations are needed to solve the problems of this interesting little genus.

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